

Inter Office

Engineering and Research Staff

April 11, 1977

PLAINTIFF'S
EXHIBIT
FD-475

To: S. Gratch
M. Humenik, Jr.
S. S. Labana
J. E. Mayer, Jr.

Subject: Non-Asbestos Friction Materials

In view of the uncertainty of future regulations regarding asbestos in friction materials and the economics/availability of quality asbestos, we are proposing an expansion of our current friction material program (10170) to include non-asbestos friction materials. A program proposal is attached, along with a copy of the Vehicle Materials Engineering Key Issue Report, Asbestos Usage -1.

A. E. Anderson

M. H. Weintraub

R. L. Gealer

38
Attachments

PQ

9001 1649

SCF-FORD-1413

New Program Proposal

Non-Asbestos Frictional Materials

Objective

To develop and to evaluate non-asbestos friction material. To carry out tribological studies of non-asbestos brake linings on cast iron and aluminum drums and rotors.

Introduction

Asbestos is the major constituent in brake linings that are used for all of Ford's passenger vehicles. Airborne asbestos fibers can be generated in a work environment during the manufacturing and/or servicing of brakes. The allowable OSHA concentration for asbestos is presently 2 fibers/cc air and is expected to be 0.5 fibers/cc air in early 1976. There also has been suggestions by NIOSH that this limit be lowered to 0.1 fibers/cc air.

To reduce asbestos levels to 0.1 fibers/cc air or even to 0.5 fibers/cc air from the current levels (about 1.2 fibers/cc air), Ford's brake lining suppliers will be forced to redesign existing equipment and/or install new processing equipment which will demand a large capital investment. One of our suppliers indicates that a level of 0.8 fibers/cc air could be achieved by modifying current processing equipment. There will be a reluctance by some of our suppliers to commit the necessary capital to convert existing plants to meet new standards because of the uncertainty of future regulations and their ability to meet them. Also government regulations may force non-asbestos brake linings by restricting the servicing of brakes with asbestos brake lining materials. Thus, Ford's suppliers may be forced to abandon the current resin/asbestos composites in favor of an asbestos-free friction material. Unfortunately there are no asbestos-free brake linings currently available that will be satisfactory for normal customer usage. It is our understanding that both Inland and Delco-Moraine divisions of GM have developed, or are developing, asbestos-free brake linings. These materials appear to require different brake designs to provide optimal performance.

To help ensure that acceptable asbestos-free formulations are available, it is recommended that Research expand the friction material program to include the development of non-asbestos brake linings. This will enable Research Staff to gain the necessary expertise to assist in developing appropriate lining quality control tests, to determine failure modes, and to assist lining vendors when appropriate. Also this program would include studies of the best lining and brake geometries for use with the resultant non-asbestos linings.

Technical Approach

A. Survey Options

- Wet Brakes
- Full Metallic
- Resin-Bonded Metallic
- Resin-Fiber

8001 1650

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8001 1651

B Evaluate Vendor Submissions

United States
Foreign

C. Selected Laboratory Studies

Carbon Fiber
Metal Wire Filled
Fiberglass Fiber
Titanate Fiber
Polymer Fiber

D. System Optimization

Lining Size and Shape
Vented on Solid Rotor
Rotor Material and Surface Finish

Project Requirements

The investigation will require the effort of 1 additional person in Polymer Science Department, 1 additional person in Machining and Wear Department, and 0.3 additional person in Technical Services.

9062 1631

(10)

ASBESTOS SUPPLIER POSITIONS
COMPLIANCE TO STANDARDS

(10)

		D'	D'	S'	
KELSON-RAYES	Brake Pads Lining and Drums	YES	NO	YES	*Bonding instead of riveting *Climate Grinding-Molded approach *Industrial Hygiene Measures *No immediate plans for automation *\$300,000 to comply plus \$110,000 annually
THIOLUX	Front Disc Pads Rear Disc Pads	YES	NO	YES	*Process change from compression to injection molding-\$1.2 million investment-would require requalification *Non-asbestos substitute presently available-one year lead time for vehicle testing required
RAYBESTOS	Clutch Facings	YES	NO	NO	*Industrial Hygiene measures to approach 1 fiber/cc. *Alternative Raw Materials being considered-glass, mineral wool, combination of fiber. *All R&D focused on non-asbestos products
ALMA	Clutch disc ass'y friction facings	YES	NO	YES	*All personnel wearing head box filters 100% of the time.
GERAL INDUSTRIES	Washers	NO	NO	NO	*Will cease operations if forced to accept standards.
WICKEN and MASCH	Reactor	YES	NO	NO	*Will stop manufacture of asbestos products if forced to accept standard.
J. K. PORTER THERMOID DIV.	Clutch Disc Shoe Lining Ass'y-Front and Rear	YES	NO	YES	*Fall 76 presentation on non-asbestos clutch facings to Ford negative response-cost equivalent *Ability to coat facings to reduce fiber/cc level at no extra cost *Standard of .1 will prohibit asbestos usage. *Brake substitutes increase wt. and cost-one year lead time.
BENDIX	Shoe + Lining	YES	NO	YES	*1.5 million to meet 1 Fiber/cc limit *5.5 million and 1-3 yrs to meet .5 fiber limit *Impossible to meet .1 level *Semi-metallic disc brakes asbestos-free backing to be completed by fall-cost increment 1.2-1.6 x weight increment 1.8 x *Fiberglass linings on drum-good in lab, not so good on road. *Critical issue-no product for drum brakes-1980-81 model year projection. *Wet sanding & grinding could be instituted.

a/ compliance to present 2 fiber/cc std.
b/ present compliance to proposed .5 fiber/cc std.
(ability to meet .5 fiber/cc level

VEHICLE MATERIALS ENGINEERING
MAY 1977

APR 1657

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